INSECT DISEASE REPORT

USDA FOREST SERVICE/NORTHERN REGION

Report No. 74-2

5200
January 1974

POTENTIAL FOR DEFOLIATION BY DOUGLAS-FIR TUSSOCK MOTH IN WESTERN MONTANA IN 1974

by

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ABSTRACT

In 1973, two centers of defoliation by Douglas-fir tussock moth totaling 350 acres were detected near Missoula, Montana. Egg mass surveys showed two sections south of Frenchtown and one section northwest of Lolo contain sufficient egg mass population to cause heavy defoliation in 1974.

INTRODUCTION

The last infestations of Douglas-fir tussock moth, *Orgyia pseudotsugata* McD., occurred in western Montana during 1965. At that time, 50 acres of Douglas-fir, *Pseudotsuga menziesii* var. *glauca* (Beissn.) Franco, were defoliated south of Polson and three 10- to 40-acre areas south of Elmo were infested (Tunnock 1965).

Aerial detection surveys during the summer of 1973 indicated that two areas were defoliated by Douglas-fir tussock moth near Missoula. One was in the Worden Creek drainage near Lolo and the other was south of Frenchtown. Altogether, about 350 acres were damaged (Tunnock et al. 1973).

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Egg mass surveys were made during November 1973 to determine potential defoliation in 1974, to find the extent of the infestation, and to collect new egg masses for evaluation of natural virus in the insect population.

METHODS

Sample plots were taken within defoliated areas and every section (1 square mile) surrounding them. A plot consisted of eight trees, and from each sample tree four limbs were cut from midcrown. Each branch was measured for length and width of foliated area and counts were made of old and new egg masses. Presence of cocoons was also recorded. These observations were made to determine number of new egg masses per thousand square inches of foliage and old to new egg mass ratios.

Whenever new egg masses were found on a plot, five masses were collected, placed in a paper bag, and stored at 35° F. In January these eggs will be hatched and incidence of natural virus estimated from the number of larvae which die from the virus in the laboratory.

Criteria for predicting hazard of Douglas-fir tussock moth defoliation is based on the following key developed by the working group of the Interagency Douglas-fir Tussock Moth Steering Committee.

DOUGLAS-FIR TUSSOCK MOTH ENTOMOLOGICAL TREATMENT CRITERIA

1. No survey data collected in the area[1/] (6)

1A. Survey data collected in the area (2)

2. No new egg masses on density or time plots - low risk

2A. New egg masses on density or time plots (3)

3. Egg mass density equal to or greater than .1[M]/sq. in.[2/] high risk (7)

1/ Usually a land section of approximately 640 acres in size but can be smaller if necessary in order to determine treatment needs more precisely.

2/ Determined from either egg mass intensity plot or time plot data.

3A. Egg mass density less than .1 M/sq. in.[2/] (4)

4. New to old egg mass ratio 1:1 or greater[2/] - high risk (7)

4A. New to old egg mass ratio less than 1:1[2/] (5)

5. Average egg mass count on time plots 15 or more - high risk (7)

5A. Average egg mass count on time plots less than 15 - low risk

6. Unsampled areas (sections) adjacent to one or more areas (sections which equal or exceed the high risk criteria above) - high risk (11)

6A. Unsampled areas (sections) not adjacent to one or more areas (sections) which equal or exceed the high risk criteria above - low risk.

7. Virus level equal or greater than 50 percent - low risk

7A. Virus level less than 50 percent (8)

8. Area (plot) located in defoliation class I or II - high risk (10)

8A. Area (plot) located in defoliation class III or IV (9)

9. Virus level equal or greater than 30 percent - low risk

9A. Virus level less than 30 percent - high risk (10)

10. Viable egg density in sampled areas less than 20 eggs per 1,000 square inches foliage - low risk

10A. Viable egg denisty on sampled areas equal or greater than 20 eggs per 1,000 square inches foliage - high risk

11. Unsampled area adjacent to an area meeting the high risk criteria after the virus and viable egg levels have been determined - high risk

11A. Unsampled area not adjacent to an area meeting the high risk criteria after the virus and viable egg levels have been determined - low risk

Low risk - control not necessary for these areas.

High risk - control will be recommended for these areas.

Criteria 1 through 6 will be used for recommending areas for direct control on the basis of egg mass data alone (about December 15, 1973).

Criteria 7 through 11 will be used for recommending areas for direct control on basis of virus incidence and egg viability data (about March 10, 1974).

RESULTS

South of Frenchtown in T. 14 N., R. 21 W., sections 10 and 22, egg masses per thousand square inches of foliage were abundant enough to cause heavy defoliation in 1974 (table 1). In addition, an informal inspection of 20-30 trees in sections 3 and 21 revealed one new egg mass in each section (fig. 1).

Northwest of Lolo in the Worden Creek drainage, new egg masses were only found in section 21, T. 12 N., R. 20 W. (fig. 1). They were numerous enough to result in larval populations sufficient to cause heavy defoliation in 1974 (table 1).

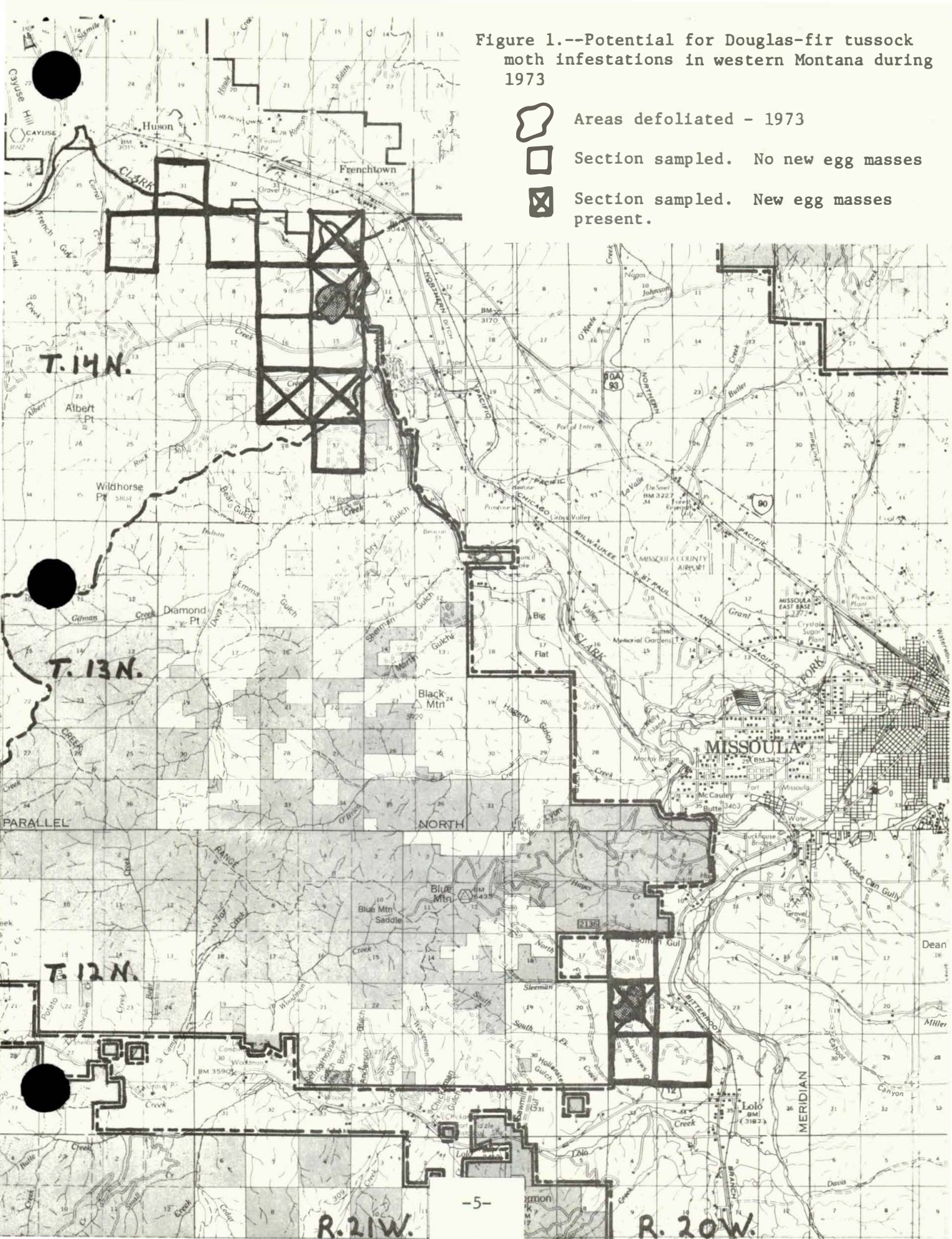
Table 1.--Egg mass densities in areas infested by the Douglas-fir tussock moth in western Montana

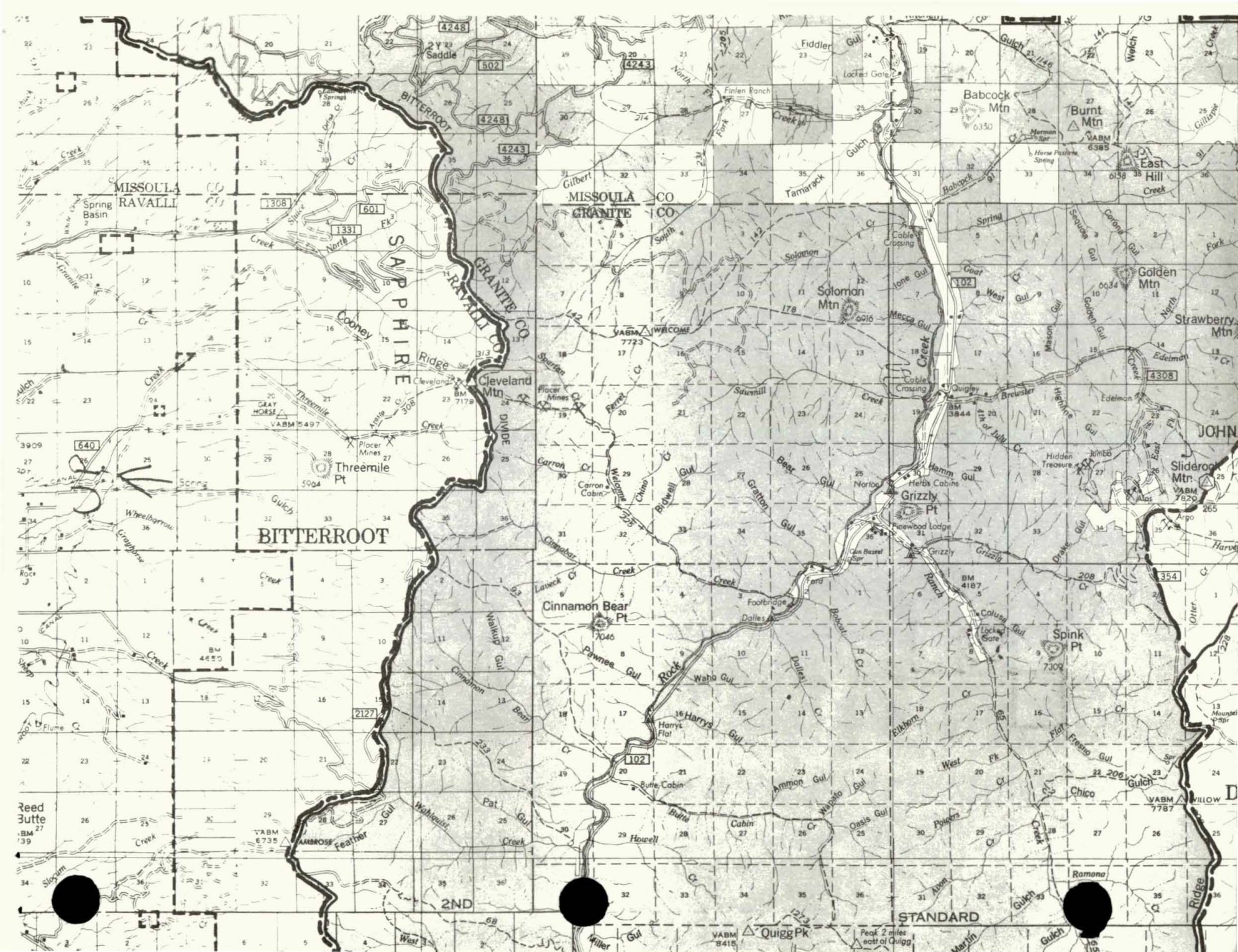
Unit	New egg masses per 1,000 square inches foliage[1/]	Old egg masses per 1,000 square inches foliage	Old:new ratio
Lolo			
T. 12 N., R. 20 W., sec 21	2.54 ± .51[2/]	0.77 ± .26	1 to 5
Frenchtown			
T. 14 N., R. 21 W., sec 10	.37 ± .13	.08 ± .06	1 to 4.5
T. 14 N., R. 21 W., sec 22	1.21 ± .25	.26 ± .11	1 to 4.8

1/ New egg masses greater than 0.10 per 1,000 square inches foliage indicates a high probability of heavy defoliation in 1974.

2/ ± 1 S.E.

Figure 1.--Potential for Douglas-fir tussock moth infestations in western Montana during 1973




MISSOULA CO
RAVALLI CO
GRANITE CO
BITTERROOT
SAPPHIRE
RAVALLI CO
DIVIDE
2nd
STANDARD
Cleveland Mtn
Threemile Pt
Cinnamon Bear Pt
Grizzly Pt
Spink Pt
Soloman Mtn
Babcock Mtn
Burnt Mtn
East Hill
Golden Mtn
Strawberry Mtn
Sliderock Mtn
Reed Butte
Quigg Pk
Peak 2 miles east of Quigg
2Y Saddle
Spring Basin
Finlen Ranch
Locked Gate
Cable Crossing
Quigley
Hamm Herbs Cabins
Pinewood Lodge
Footbridge
Dalles
Harrys Flat
Butte Cabin
Chico
Ramona
Gray Horse
Ambrose
Welcome
Carron Cabin
Placer Mines
Bidwell Gul
Gratton Gul
Rock Gul
Pawnee Gul
Wahlquist Gul
Pat Gul
Ammon Gul
Wapato Gul
Oasis Gul
Powers Creek
Elkhorn Flat
Fresno Gul
Drake Gul
Hidden Treasure
Jumbo
Argo
Harvard
Otter
Mountain Spr
Sequoia Gul
Carlon Gul
Golden Gul
Mason Gul
Lone Gul
Goat West Gul
Mecca Gul
Edelman Creek
Highline
4th of July Cr
Sawmill Creek
Ferrel Cr
Sheridan Cr
Carron Cr
Chinook Cr
Lanock Cr
Cinnabar Creek
Wheelbarrow Creek
Graybrook Creek
Cooney Ridge
Sluice Creek
Lost Cr
Tamarack Gulch
Fiddler Gulch
Babcock
Gilbert
Solomon
Welch Creek
Gillstine
Ramona Gulch
Martin Gulch
Miller Gul
Howell
Flume Cr
Canal
Spring
Rock
Ridge
Creek
Gulch
Cr
Fk
Mtn
Pt
Spr
Basin
Lake
Pond
Cabin
Ranch
Flat
Gul
Ridge
Divide
Hwy 502
Hwy 4248
Hwy 4243
Hwy 1308
Hwy 601
Hwy 1331
Hwy 313
Hwy 308
Hwy 640
Hwy 2127
Hwy 102
Hwy 4308
Hwy 354
Hwy 142
Hwy 178
Hwy 205
Hwy 141
Hwy 91
Hwy 214
Hwy 233
Hwy 68
Hwy 208
Hwy 206
Hwy 65
Hwy 229
Hwy 265
VABM 7723
VABM 5497
VABM 6735
VABM 8415
VABM 6385
VABM 7820
VABM 7787
BM 7178
BM 4659
BM 3844
BM 4187
6350
6038
6034
6016
5904
7046
7309
8415
1213

It is doubtful that these infestations will spread significantly from the above sections in 1974 because no new egg masses were found in surrounding areas. Other spot infestations may appear in western Montana in 1974, but they are not detectable on the basis of this survey.

REFERENCES CITED

Tunnock, S., 1965. Evaluation of Douglas-fir tussock moth infestations in northern Idaho and northwestern Montana, 1965. Unpub. report, USDA, Forest Serv., Div. of State and Priv. Forestry, Fed. Bldg., Missoula, Montana.

Tunnock, S., J. E. Dewey, R. Lood, and R. L. Livingston, 1973. Status of Douglas-fir tussock moth infestations in the Northern Region. Report 73-23, USDA, Forest Serv., Div. State and Priv. Forestry, Fed. Bldg., Missoula, Montana.